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36. Ecosystem based solutions for adaptation and disaster risk reduction when considering multiple risks (OPEN)

Contribution of sustainable agricultural management practices to reduce the impacts of extreme weather events in Tropical America

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One of the most accessible adaptation strategies for climate change and extreme weather events for smallholder farmers consists in the implementation of sustainable management practices. Drawing from a systematic review of 326 documents from peer-reviewed and grey literature our study analyses the potential contribution of 39 management practices to Ecosystem-based Adaptation (EBA) for two important agroecosystems (coffee and basic grains) for smallholders in Central America. Specifically, we examined which agricultural management practices confer adaptive benefits, what the specific mechanism were by which these practices conferred adaptation benefits, which of these practices can be considered to be 'EbA' and what key knowledge gaps remain. Our results suggest that many existing agricultural practices can reduce the negative impacts of extreme weather events (e.g., hurricanes and droughts) on smallholder coffee, maize, and bean agroecosystems. They do so by buffering temperature extremes, reducing wind speed within the agroecosystem, increasing the genetic tolerance to climatic stresses, improving soil biophysical and biological conditions, and regulating pest and disease cycles. Many practices (e.g., tree shade in coffee, or use of cover crops and conservation tillage for basic grains) not only help farmers adapt to climate change but also provide additional livelihood benefits (such as improved income or food security), however, some trade-offs still exists. For example, shaded coffee was the most promising and documented practice for adaptation in coffee agroecosystems because the use of trees increases the resilience of the coffee plantation to extreme weather events, diversifies farm production, and increases agroecosystem biomass. However, under certain conditions shading coffee can reduce short-term coffee yield, increase the severity of some pests and diseases, and even reduce soil water content. It is therefore important that policy makers designing adaptation strategies for agricultural landscapes have a clear understanding of the benefits and drawbacks of different adaptation measures in different landscape contexts and tailor their recommendations accordingly.